What is Claimed Is:

1. An apparatus for determining the presence of a trace species in a sample gas contained in a resonant cavity, the apparatus comprising:

at least one light source for generating radiation;

a controller coupled to the at least one light source for controlling a frequency of the radiation, the controller varying the frequency of the radiation over a predetermined frequency range; and

a processor coupled to the resonant cavity for determining a level of absorption within the resonant cavity over the predetermined frequency range.

2. The apparatus according to claim 1, wherein the controller varies the frequency of the at least one light source over a predetermined time period.

3. The apparatus according to claim 2, wherein the frequency is varied at a substantially constant rate over the predetermined time period.

4. The apparatus according to claim 2, wherein a profile of the frequency is one of a sawtooth wave pattern and a triangle pattern.

5. The apparatus according to claim 2, wherein a profile of the frequency has a leading edge slope and a trailing edge slope that are substantially identical.

6. The apparatus according to claim 1, wherein the controller varies the frequency of the at least one light source based on a temperature of the at least one light source.

7. The apparatus according to claim 6, wherein the frequency is varied at a substantially constant rate over the predetermined time period.

8. The apparatus according to claim 6, wherein an initial temperature is about 0 degrees Centigrade.

9. The apparatus according to claim 6, wherein a profile of the temperature is one of a sawtooth wave pattern and a triangle pattern.

10. The apparatus according to claim 6, wherein a profile of the temperature has a leading edge slope and a trailing edge slope that are substantially identical.

11. The apparatus according to claim 6, wherein the frequency of the radiation is proportional to the temperature.

12. The apparatus according to claim 6, wherein the temperature is repeatedly swept over a predetermined range.

13. The apparatus according to claim 1, wherein the controller controls a current supplied to the at least one light source.

14. The apparatus according to claim 13, wherein the controller varies the frequency of the at least one light source over a predetermined time period based on the current.

15. The apparatus according to claim 14, wherein the current is varied at a substantially constant rate over the predetermined time period.

16. The apparatus according to claim 13, wherein a profile of the current is one of a sawtooth wave pattern and a triangle pattern.

17. The apparatus according to claim 13, wherein a profile of the current has a leading edge slope and a trailing edge slope that are substantially identical.

18. The apparatus according to claim 1, wherein the processor determines an absorption spectrum of the sample gas based on a ring-down rate of the radiation within the resonant cavity.

19. The apparatus according to claim 1, wherein the level of the trace species is a plurality of levels taken at respective frequencies of the light source.

20. The apparatus according to claim 1, wherein the at least one light source is a plurality of light sources, each generating a respective radiation output.

21. The apparatus according to claim 1, further comprising a coupler for coupling the radiation into an input of the resonant cavity.

22. The apparatus according to claim 1, wherein the controller controls both a temperature of the at least one light source and a current supplied to the at least one light source.

23. A system for determining the presence of a trace species in a sample gas, the system comprising:

a resonant cavity containing at least a portion of the sample gas;

at least one light source for generating radiation;

a coupler for coupling the radiation into the resonant cavity;

a controller coupled to the at least one light source for controlling a frequency of the radiation based on at least one of a temperature of the light source and a current supplied to the light source, the controller varying the temperature and/or the current of the light source over a predetermined range; and

a processor coupled to the resonant cavity for determining a level of the trace species within the resonant cavity over the frequency.

24. The system according to claim 23, wherein at least one of the temperature and the current are varied at a substantially constant rate over a predetermined time period.

25. The system according to claim 23, wherein the processor determines an absorption spectrum of the sample gas based on a ring-down rate of the radiation within the resonant cavity.

26. A method for determining the presence of a trace species in a sample gas contained in a resonant cavity, the method comprising the steps of:

a) generating radiation from at least one light source;

b) coupling the radiation into an input of the resonant cavity;

c) controlling a frequency of the radiation of the at least one light source;

d) varying the frequency of the radiation over a predetermined frequency range; and

e) determining a level of the trace species within the resonant cavity over the predetermined frequency range.

27. The method according to claim 26, further comprising the step of:

repeatedly varying the frequency of the light source over the predetermined frequency range.

28. The method according to claim 26, wherein the controlling step c) further comprises at least one of the steps of:

controlling a temperature of the light source; and

controlling a current provided to the light source.

29. An apparatus for determining the presence of a trace species in a sample gas contained in a resonant cavity comprising:

means for generating radiation from at least one light source;

means for coupling the radiation into an input of the resonant cavity;

means for controlling a frequency of the radiation of the at least one light source;

means for varying the frequency of the radiation over a predetermined frequency range; and

means for determining a level of the trace species within the resonant cavity over the predetermined frequency range.